**Holobiont nitrogen control and its potential for eutrophication resistance in an obligate photosymbiotic jellyfish**

Till Röthig1,2,3,#,\*, Giulia Puntin1,4,#, Jane CY Wong1, Alfred Burian5,6, Wendy McLeod1, David M Baker1,\*

1 The Swire Institute of Marine Science and School of Biological Sciences, The University of Hong Kong, Hong Kong, SAR China

2 Department of Bioresources, Fraunhofer Institute for Molecular Biology and Applied Ecology, Giessen, Germany

3 Department of Biology, University of Konstanz, Konstanz, Germany

4 Department of Animal Ecology & Systematics, Justus Liebig University, Giessen, Germany

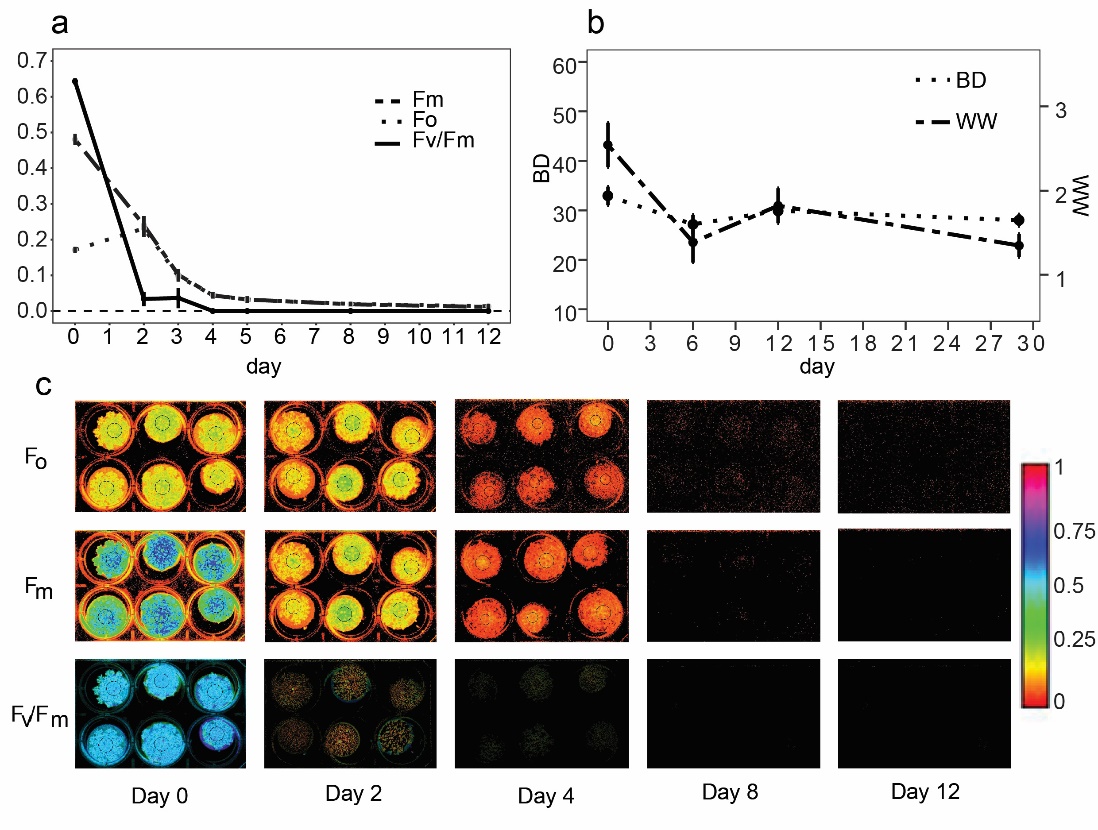
5 Marine Ecology Department, Lurio University, Nampula, Mozambique

6 Department of Computational Landscape Ecology, UFZ– Helmholtz Centre for Environmental Research, Leipzig, Germany

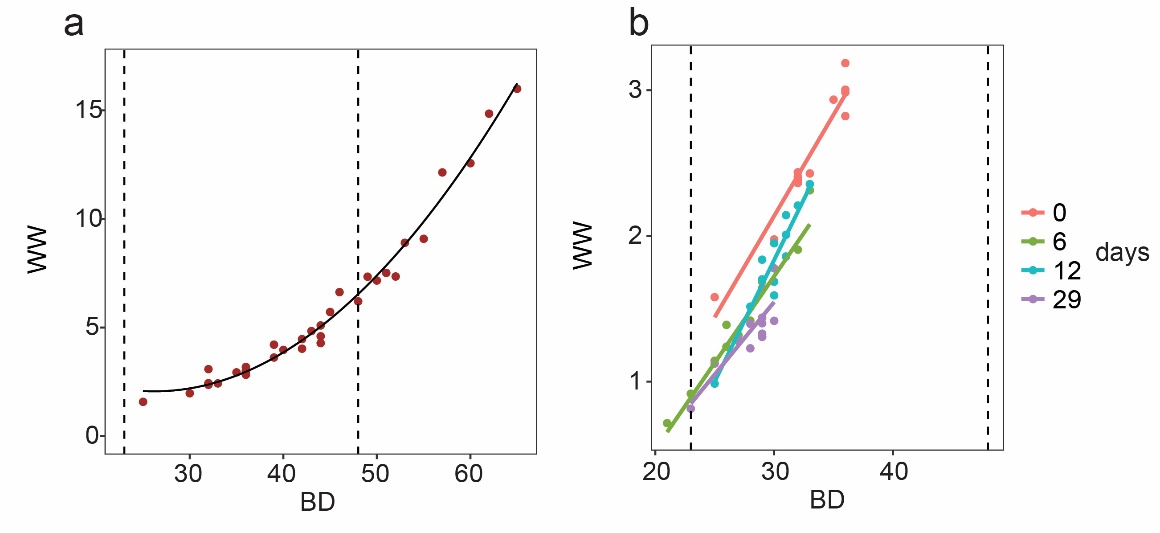
# contributed equally

\* Corresponding author

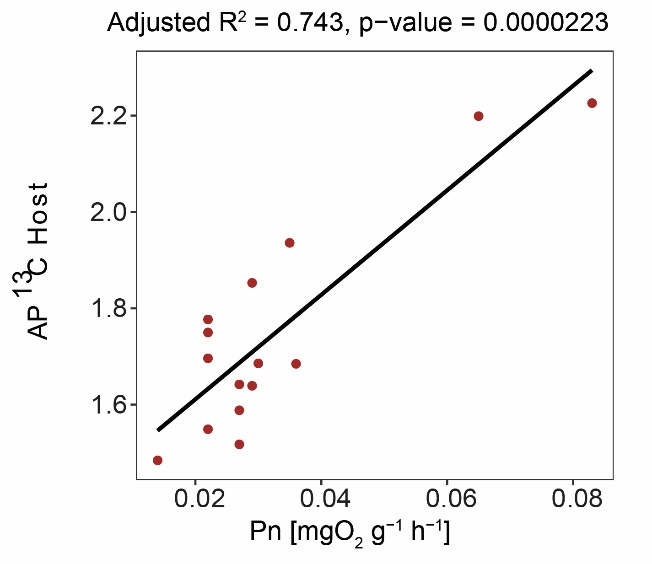
**Additional Information File 1 – Supplementary Figures**



**Fig.S1. Effects of menthol bleaching on *C. xamachana****.* (**a**) Photosynthetic efficiency throughout menthol exposure (day 1-4) and bleaching process. n = 12; Imaging-PAM, Walz, Germany; *Fo*: dark-adapted minimal fluorescence yields; *Fm*: dark-adapted maximal fluorescence yield; *Fv/Fm*: maximum quantum yield. (**b**) Response of bell diameter (BD) and wet weight (WW) towards bleaching (mean, n = 12). c: Visualization of photosynthetic efficiency (i.e., *Fo*, *Fm*, and *Fv/Fm*).



**Fig.S2. Relationship between wet weight (WW) and bell diameter (BD)** in (**a**) symbiotic (n = 35) [WWsymbiotic = 8.538 + (-0.494\*BD) + (0.009\*BD2)] and (**b**) aposymbiotic *C. xamachana* (n = 12) [WWaposymbiotic = -1.440 + (0.100\*BD)]. Different colors indicate the number of days after the start of the four day menthol bleaching. Dashed vertical lines indicate minimum and maximum BD of medusae employed in the pulse-chase experiment.

****

**Fig.S3. Net primary production (Pn) and host carbon enrichment.** Host fraction enrichment expressed as AP13C light-incubated medusae (SymL) from all incubations (pulse, chase 3 h and chase 6 h; n = 15; y = 1.394 + 10.845x).